

# COLUMBINE LOGGING

Scale: 5" / 100'  
Measured Depth Log

**Well Name** Rohn State LD04-68-1HN(VERT)

**Location** NWNW SEC 4, T9N, R58W

**State** COLORADO

**County** WELD

**Country** USA

**Rig Number** H&P 326

**API Number** 05-123-37479

**Region** DJ BASIN

**Field** WILDCAT

**Spud Date** 8/10/2013

**Drilling Completed** 8/12/2013

**Surface Coordinates** 585' FNL, 400' FWL

**Bottom Hole Coordinates** 990' FNL, 675' FEL

**Ground Elevation** 4748'

**K.B. Elevation** 4778'

**Logged Interval** 700' To 5014'

**Total Depth** 5014'

**Formation** NIOBRARA A CHALK

**Type of Drilling Fluid** LSND

## Operator

**Company** NOBLE ENERGY INC.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

## Geologist

**Name** EVAN HOWELL

**Company** NOBLE ENERGY INC.

**Address** 1625 Broadway Suite 2200  
Denver, CO 80202

## Other

ANDREA ZUREMA

## Rock Types

UNKNOWN	COAL	METAMORPHIC	SHALY SILTSTONE
ANHYDRITE	CONGLOMERATE	NO SAMPLE	SILTSTONE
BENTONITE	DOLOMITE	SALT	SILTY SHALE
BRECCIA	GRANITE	SALT- PEPPER SAND	TILL
CEMENT	GYPSUM	SANDSTONE	TUFF
CHALK	IGNEOUS	SHALE	WELDED TUFF
CHERT	LIMESTONE	SHALE COLORED	
CLAY CHOKE SAND	SIDERITE or LIMONITE	SHALE GRAY	
CLAYSTONE	MARLSTONE	SHALY SANDSTONE	

## Accessories

### Fossils

ALGAE
AMPHIPORA
BELEMNITE
BIOCLASTIC
BRACHIOIPOD
BRYOZOA
CEPHALOPOD
CORAL
CRINOID
ECHINOID
FISH
FORAMINIFERA

### Fossils

FOSSIL
GASTROPOD
INOCERAMUS
OOLITE
OSTRACOD
PELECYPOD
PELLET
PISOLITE
PLANT REMAINS
PLANT SPORES
SCAPHOPOD
STROMATOPOROID

### Minerals

### Minerals

ANHYDRITIC
ARGILLACEOUS
ARGILLITE GRAIN
BENTONITE
BITUMENOUS SUBSTANCE
BRECCIA FRAGMENTS
CALCAREOUS
CARBONACEOUS FLAKES
CHTDK
CHTLT
COAL - THIN BEDS
DOLOMITIC
FELDSPAR
FERRUGINOUS PELLET

### Minerals

FERRUGINOUS
GLAUCONITE
GYPSIFEROUS
HEAVY MINERAL
KAOLIN
MARLSTONE
MINERAL CRYSTALS
NODULES
PHOSPHATE PELLETS
PYRITE
SALT CAST
SANDY
SILICEOUS
SILTY

### Minerals

TUFFACEOUS
STRINGER
ANHYDRITE STRINGER
BENTONITE STRINGER
COAL STRINGER
DOLOMITE STRINGER
GYPSUM STRINGER
LIMESTONE STRINGER
MARLSTONE (CALC) STRG
MARLSTONE (DOL) STRG
SANDSTONE STRINGER
SHALE STRINGER
SILTSTONE STRINGER

## Other Symbols

### Oil Show

DEAD
EVEN
QUESTIONABLE
SPOTTED STAINING

### Porosity

EARTHY
FENESTRAL
FRACTURE
INTERCRYSTALLINE
INTEROOLITIC

### Oil Show

MOLDIC
ORGANIC
PINPOINT
VUGGY

### Engineering

BIT
CONNECTION (LEFT)
CONNECTION (RIGHT)
CONNECTION GAS
CORE - LOST
CORE - RECOVERED
DST INTERVAL

### Other Symbols

FAULT
FORMATION TOP
GAS SHOW
MN DEPTH
NORMAL FAULT
OIL SHOW
OVERTURNED STRATA
REVERSE FAULT
SIDEWALL CORE (LEFT)
SIDEWALL CORE (RIGHT)
SLIDE
SURVEY
TRIP GAS

### Other Symbols

WIRELINE TESTED - LEFT
WIRELINE TESTED - RT

### Rounding

ANGULAR
ROUNDED
SUBANG
SUBRND

### Textures

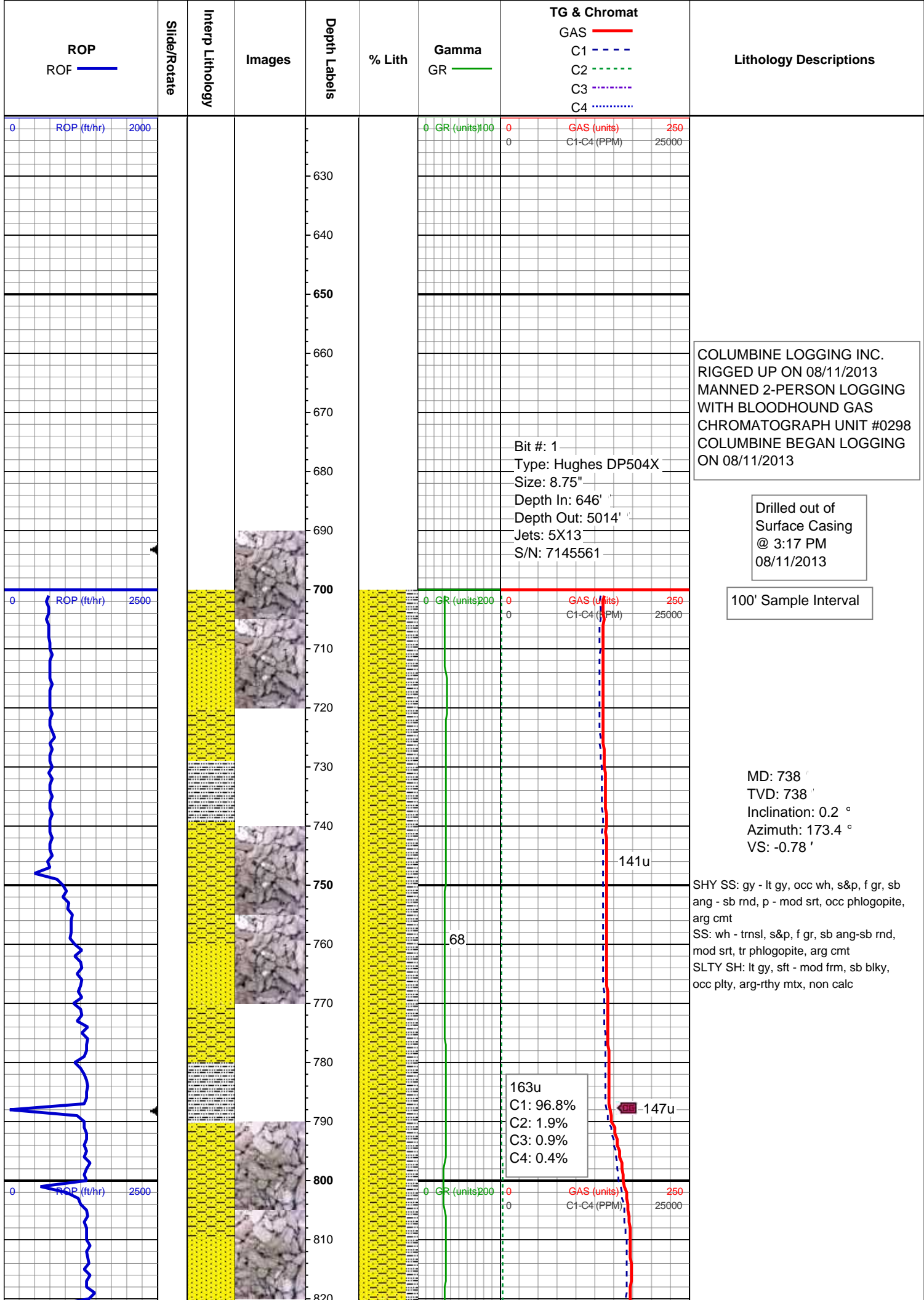
BOUNDSTONE
CHALKY
CRYPTOXLN

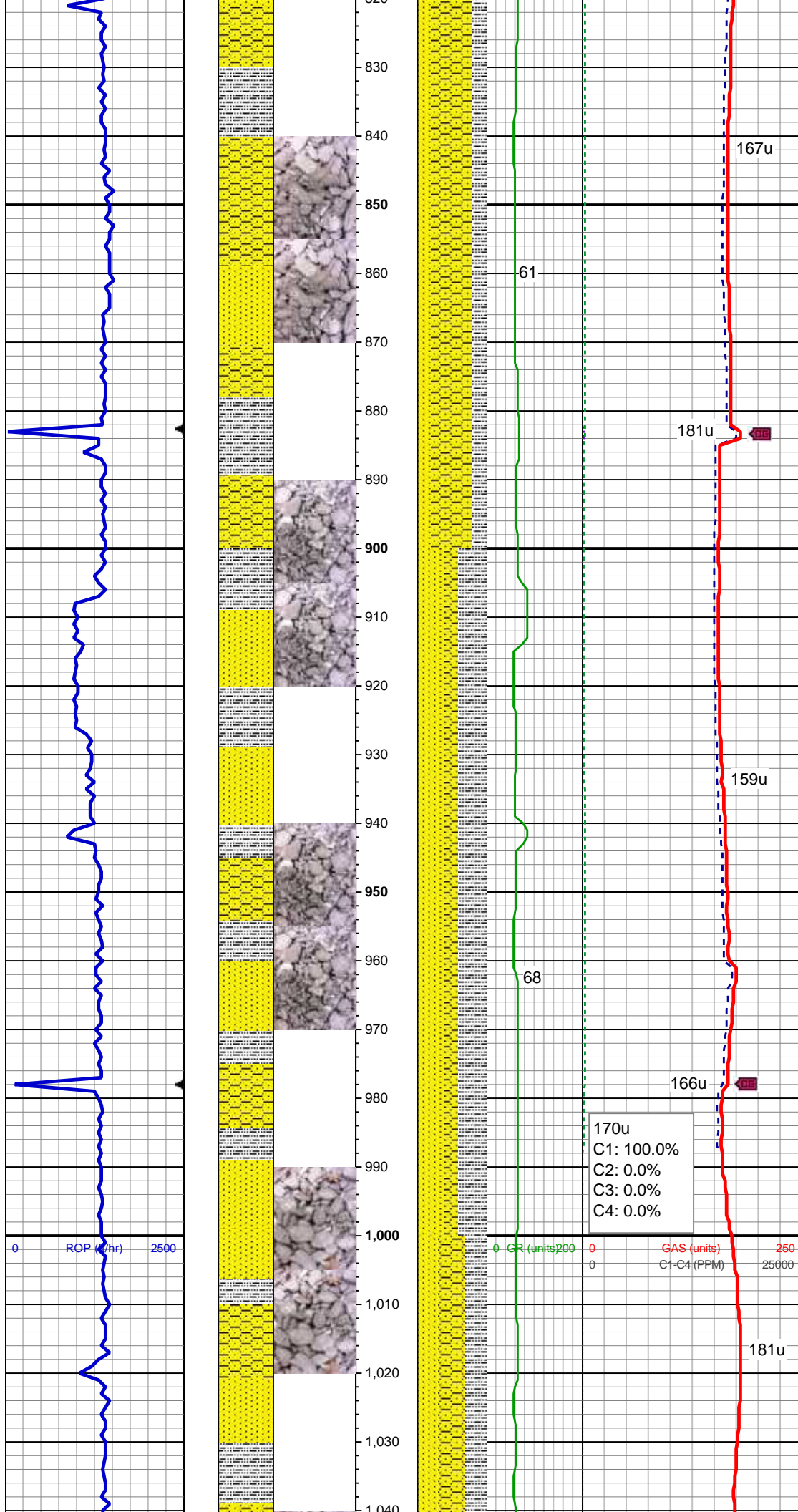
### Other Symbols

EARTHY
FINELYXLN
GRAINSTONE
LITHOGRAPHIC
MICROXLN
MUDSTONE
PACKSTONE
WACKESTONE

### Sorting

MODERATE
POOR
WELL





MD: 832 '  
TVD: 832 '  
Inclination: 0.3 °  
Azimuth: 111.7 °  
VS: -0.53 '

167u  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, occ phlogopite,  
arg cmt  
SS: wh - trnsl, s&p, f gr, sb ang-sb rnd,  
mod srt, tr phlogopite, arg cmt  
SLTY SH: lt gy, sft - mod frm, sb blkly,  
occ plty, arg-rthy mtx, non calc

MD: 927 '  
TVD: 926.99 '  
Inclination: 0.3 °  
Azimuth: 159.8 °  
VS: -0.21 '

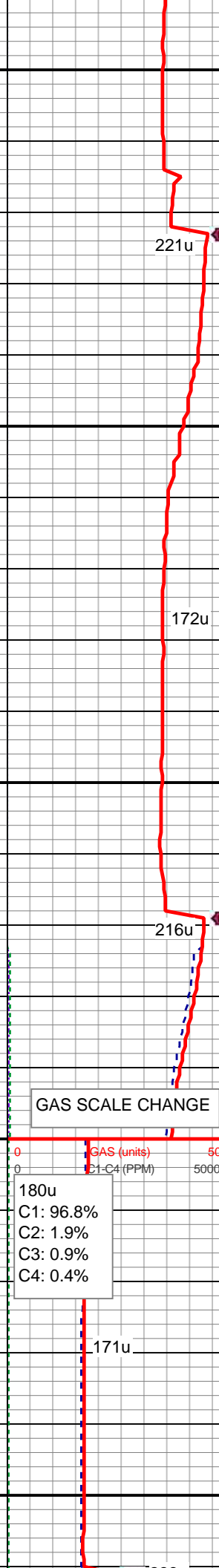
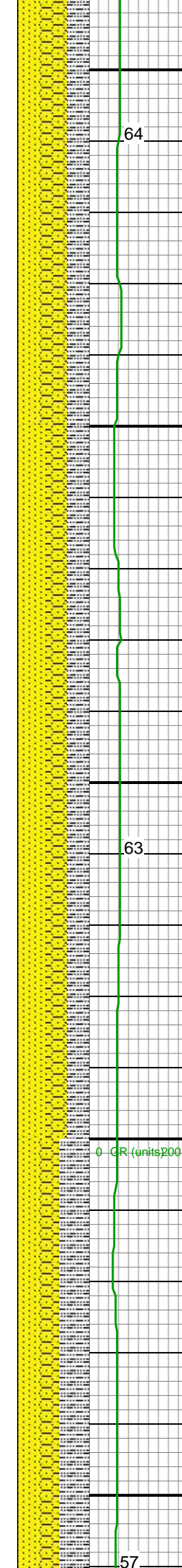
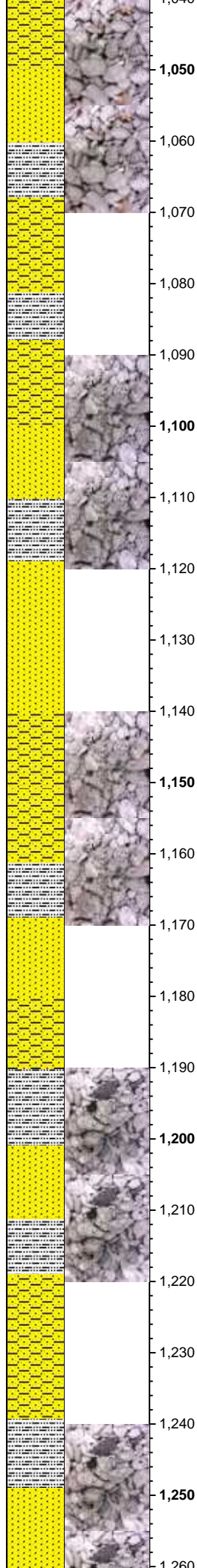
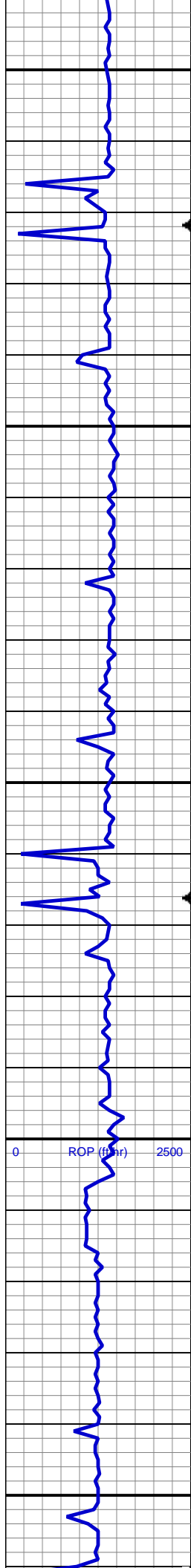
159u  
SLTY SH: lt gy, sft - mod frm, sb blkly,  
occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, occ phlogopite,  
arg cmt  
SS: wh - trnsl, s&p, f gr, sb ang-sb rnd,  
mod srt, tr phlogopite, arg cmt

170u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

MD: 1,022 '  
TVD: 1,021.99 '  
Inclination: 0.7 °  
Azimuth: 162.8 °  
VS: 0.07 '

181u





SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, occ phlogopite, arg cmt  
SS: wh - trnsf, s&p, f gr, sb ang-sb rnd, mod srt, tr phlogopite, arg cmt  
SLTY SH: lt gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc

MD: 1,116 '  
TVD: 1,115.99 '  
Inclination: 0.5 °  
Azimuth: 165.6 °  
VS: 0.36 '

SS: wh - trnsf, s&p, f gr, sb ang-sb rnd, mod srt, tr phlogopite, arg cmt  
SLTY SH: lt gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, occ phlogopite, arg cmt

MD: 1,211 '  
TVD: 1,210.98 '  
Inclination: 0.4 °  
Azimuth: 159.3 °  
VS: 0.59 '

WT IN 8.70/ OUT 8.70  
VIS IN 27/ OUT 27

SLTY SH: lt gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, occ phlogopite, arg cmt  
SS: wh - trnsf, s&p, f gr, sb ang-sb rnd,

64

221u

172u

63

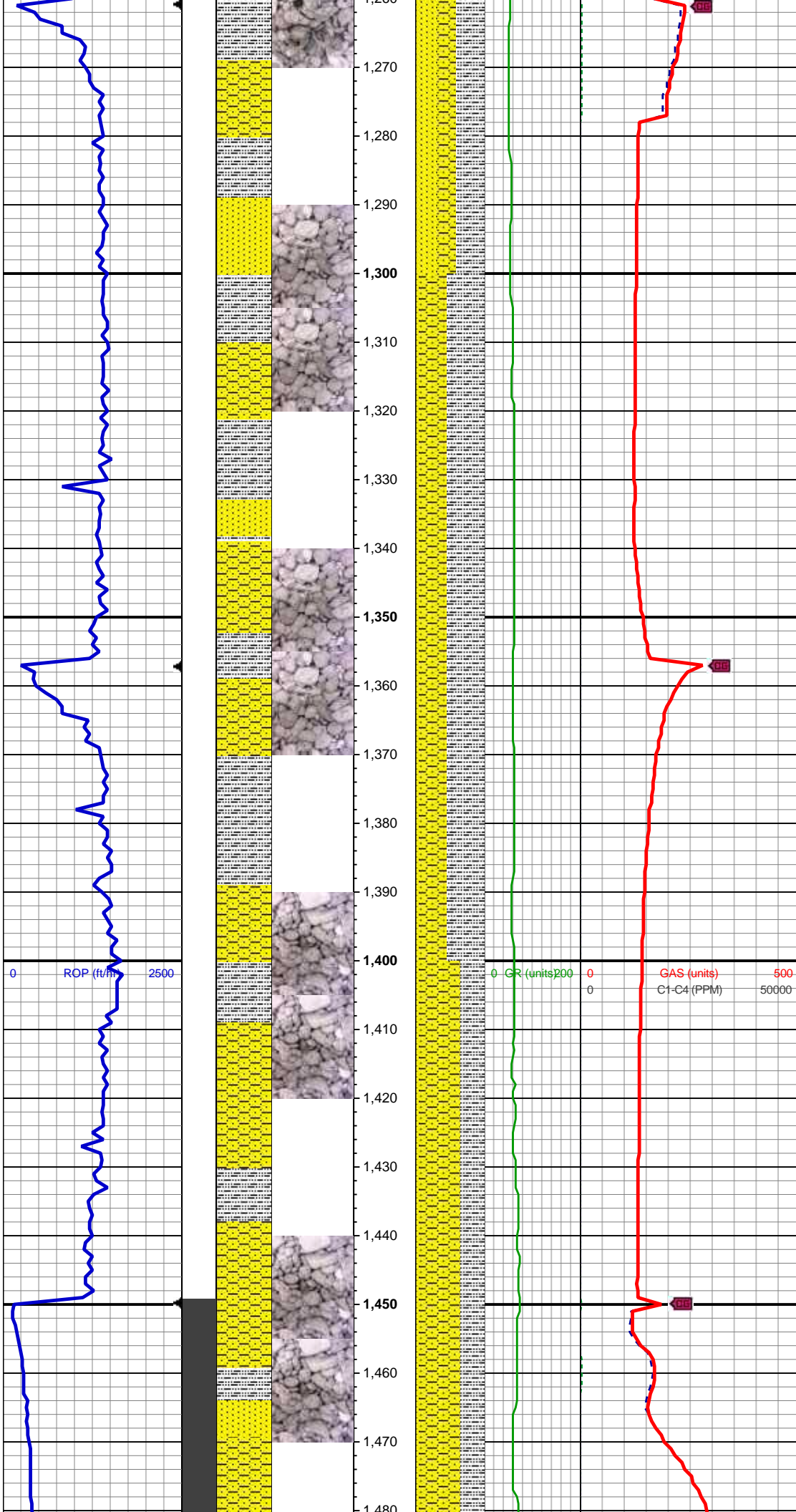
216u

GAS SCALE CHANGE

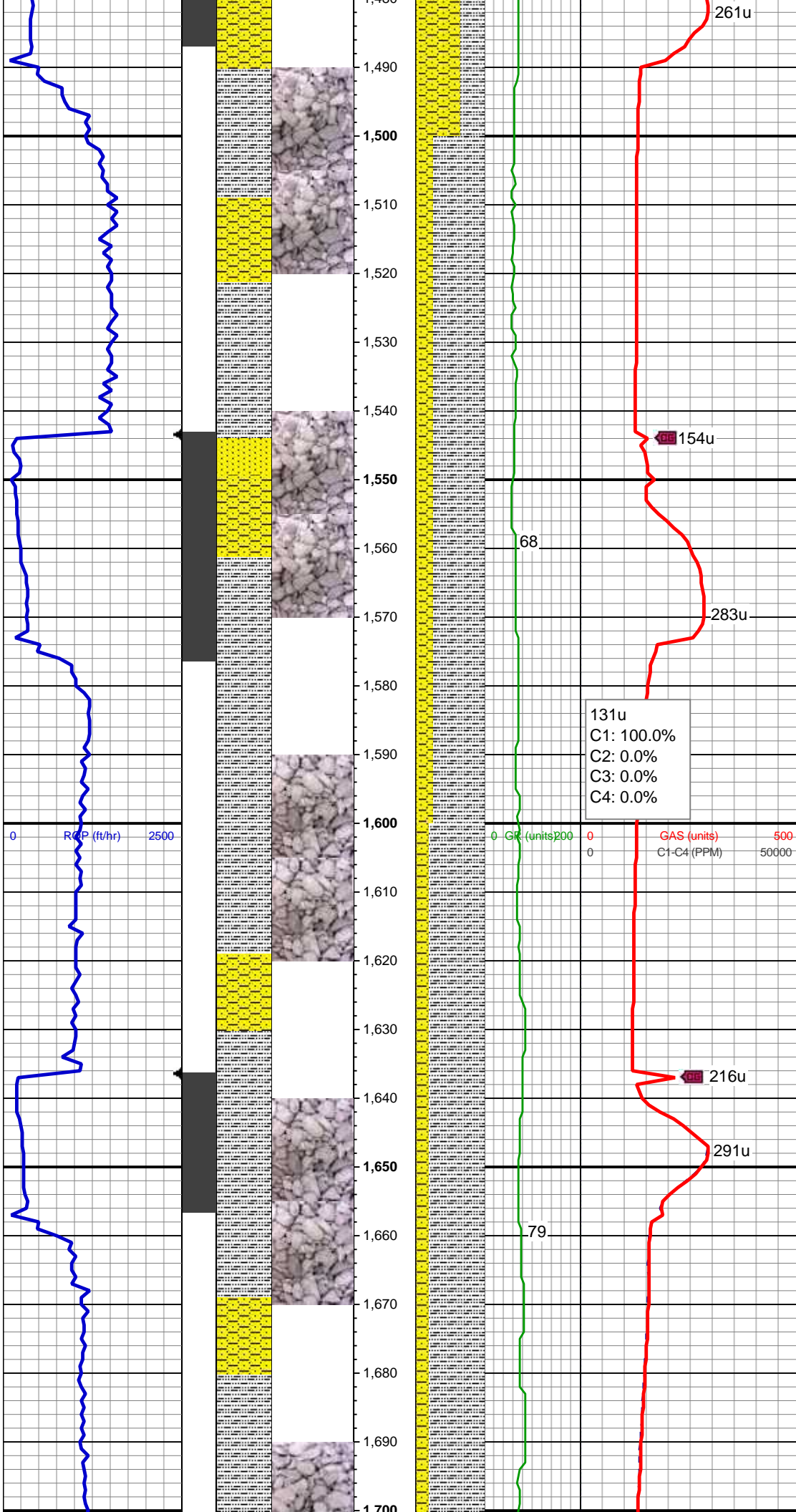
180u  
C1: 96.8%  
C2: 1.9%  
C3: 0.9%  
C4: 0.4%

171u

57







MD: 1,492 '  
TVD: 1,491.91 '  
Inclination: 3.4 °  
Azimuth: 194.1 °  
VS: 0.37 '

WT IN 8.70/ OUT 8.70  
VIS IN 28/ OUT 28

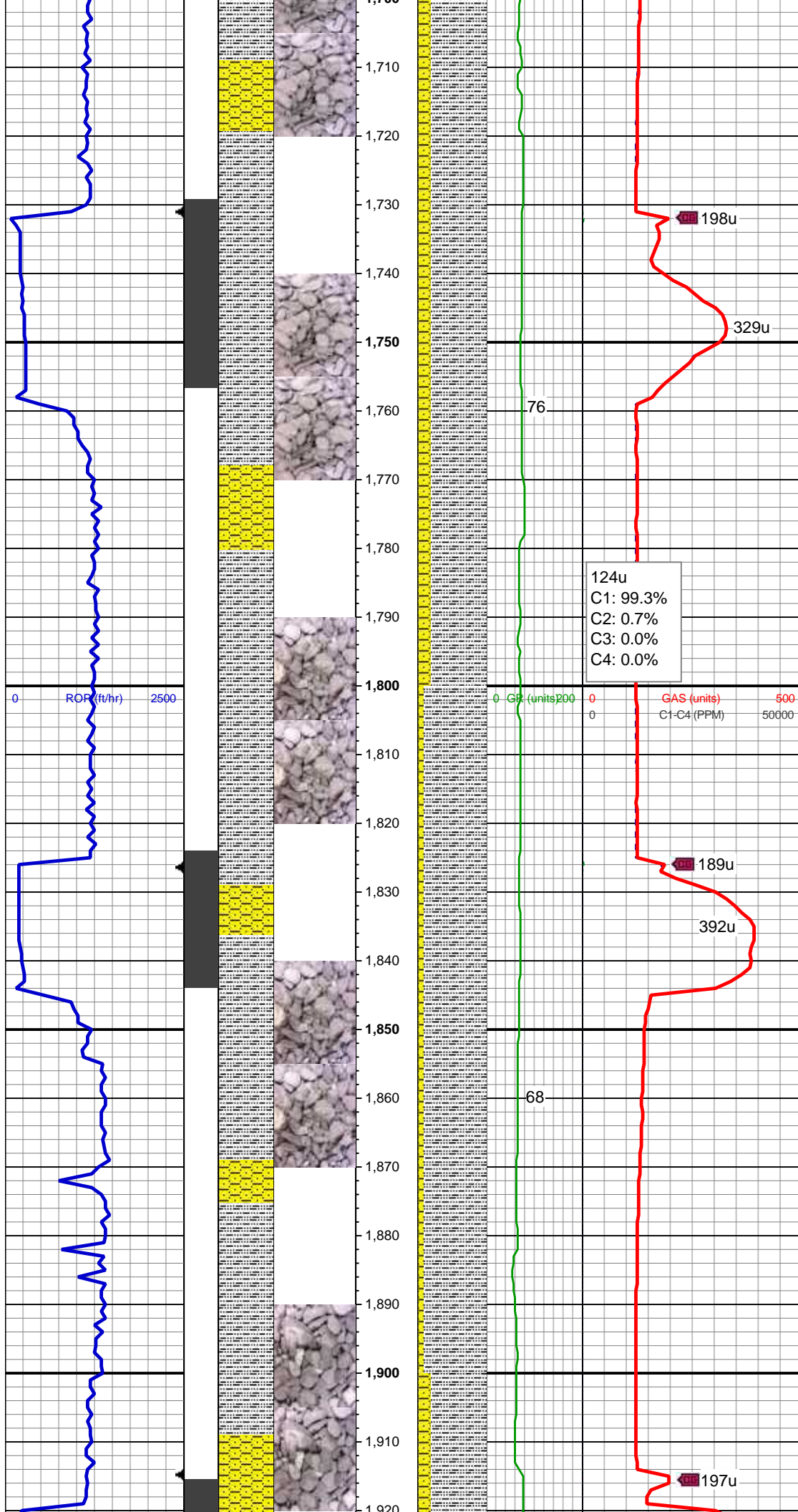
SLTY SH: lt gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, occ phlogopite, arg cmt  
SS: wh - trns, s&p, f gr, sb ang-sb rnd, mod srt, tr phlogopite, arg cmt

MD: 1,586 '  
TVD: 1,585.63 '  
Inclination: 5.4 °  
Azimuth: 182.7 °  
VS: -0.36 '

131u  
C1: 100.0%  
C2: 0.0%  
C3: 0.0%  
C4: 0.0%

SLTY SH: lt gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, occ phlogopite, arg cmt

MD: 1,679 '  
TVD: 1,678.1 '  
Inclination: 6.8 °  
Azimuth: 181.6 °  
VS: -0.51 '



WT IN 8.70/ OUT 8.70  
VIS IN 27/ OUT 27

SLTY SH: lt gy, sft - mod frm, sb blkly,  
occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, occ phlogopite,  
arg cmt

MD: 1,773 '  
TVD: 1,771.27 '  
Inclination: 8.4 °  
Azimuth: 177.8 °  
VS: -0.14 '

124u  
C1: 99.3%  
C2: 0.7%  
C3: 0.0%  
C4: 0.0%

0 ROP (ft/hr) 2500

0 GR (units) 200 0 GAS (units) 500  
0 C1-C4 (PPM) 50000

SLTY SH: lt gy, sft - mod frm, sb blkly,  
occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, occ phlogopite,  
arg cmt

MD: 1,864 '  
TVD: 1,861.13 '  
Inclination: 9.8 °  
Azimuth: 175.6 °  
VS: 1.01 '

WT IN 8.70/ OUT 8.70



WT IN 8.70/ OUT 8.70  
VIS IN 29/ OUT 29

SLTY SH: lt gy, sft - mod frm, sb blkly,  
occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, occ phlogopite,  
arg cmt

MD: 1,956 '  
TVD: 1,951.68 '  
Inclination: 10.6 °  
Azimuth: 169.5 °  
VS: 3.49 '

204u  
C1: 94.0%  
C2: 3.5%  
C3: 0.3%  
C4: 2.1%

SAS (units) 500  
C1-C4 (PPM) 50000

160u

450u

MD: 2,049 '  
TVD: 2,042.92 '  
Inclination: 11.7 °  
Azimuth: 166.5 °  
VS: 7.62 '

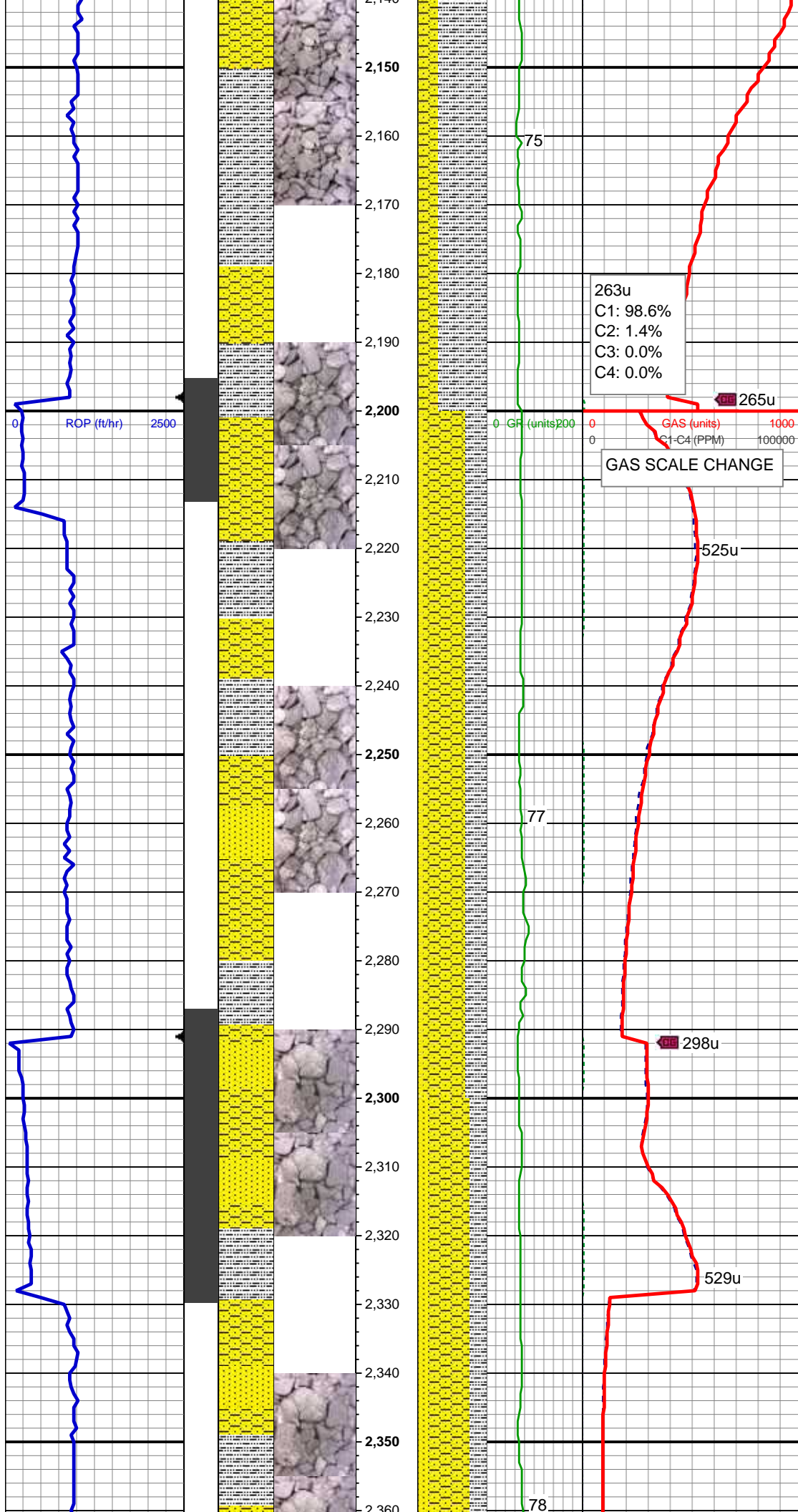
SLTY SH: lt gy, sft - mod frm, sb blkly,  
occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, occ phlogopite,  
arg cmt

235u

482u

WT IN 8.65/ OUT 8.65  
VIS IN 29/ OUT 29

MD: 2,143 '  
TVD: 2,134.81 '



Inclination: 12.6 °  
Azimuth: 165.3 °  
VS: 12.85 '

SLTY SH: lt gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, occ phlogopite, arg cmt

263u  
C1: 98.6%  
C2: 1.4%  
C3: 0.0%  
C4: 0.0%

265u

GAS SCALE CHANGE

525u

MD: 2,235 '  
TVD: 2,224.54 '  
Inclination: 12.9 °  
Azimuth: 163 °  
VS: 18.81 '

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, arg cmt  
SS: wh - trnsl, s&p, f gr, sb ang-sb rnd, p-mod srt, tr glau, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc

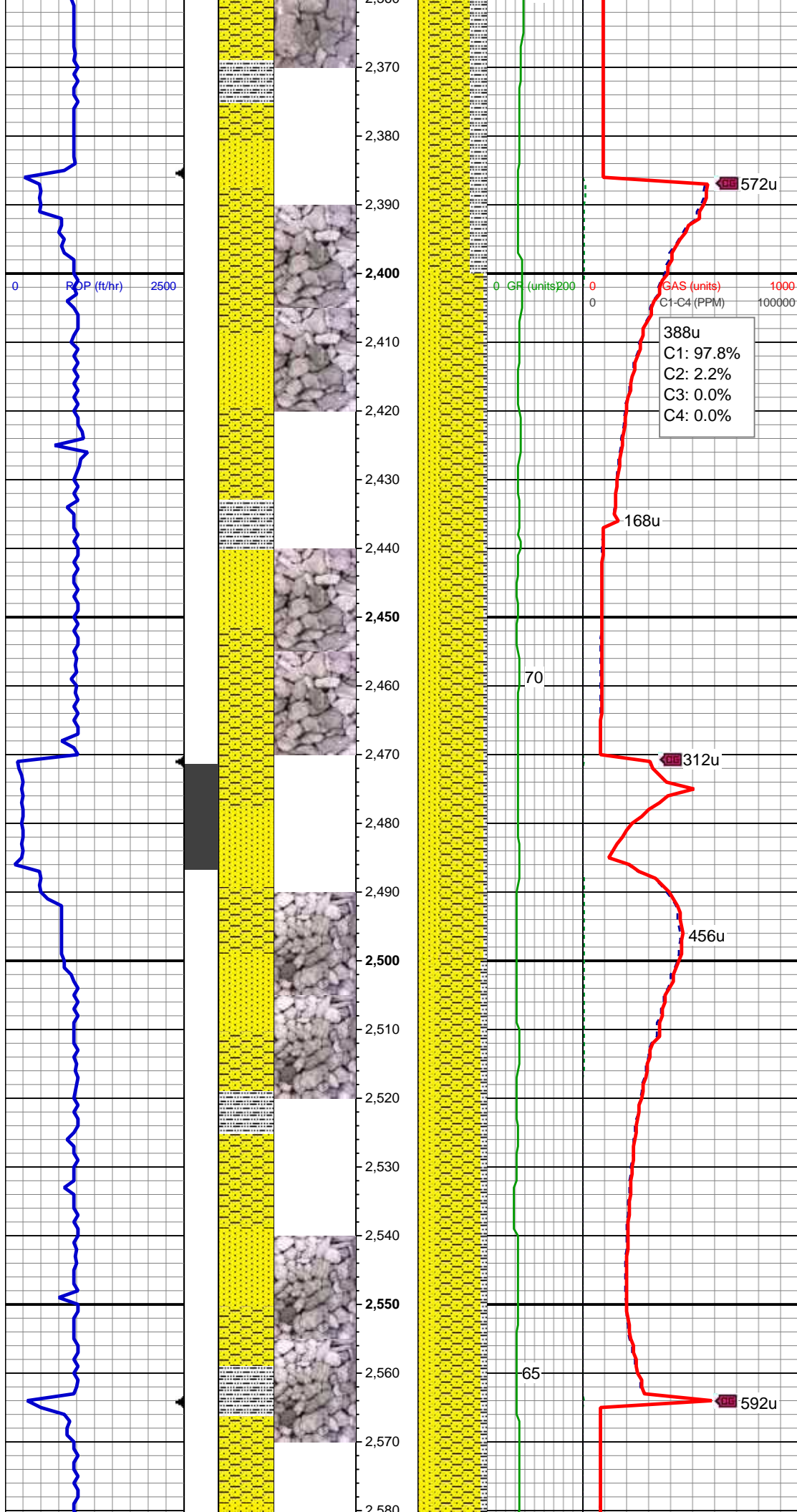
298u

529u

MD: 2,327 '  
TVD: 2,313.79 '  
Inclination: 15.2 °  
Azimuth: 166.3 °  
VS: 25.13 '

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, arg cmt  
SS: wh - trnsl, s&p, f gr, sb ang-sb rnd, p-mod srt, tr glau, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb blk, occ pty, arg-rthy mtx, non calc





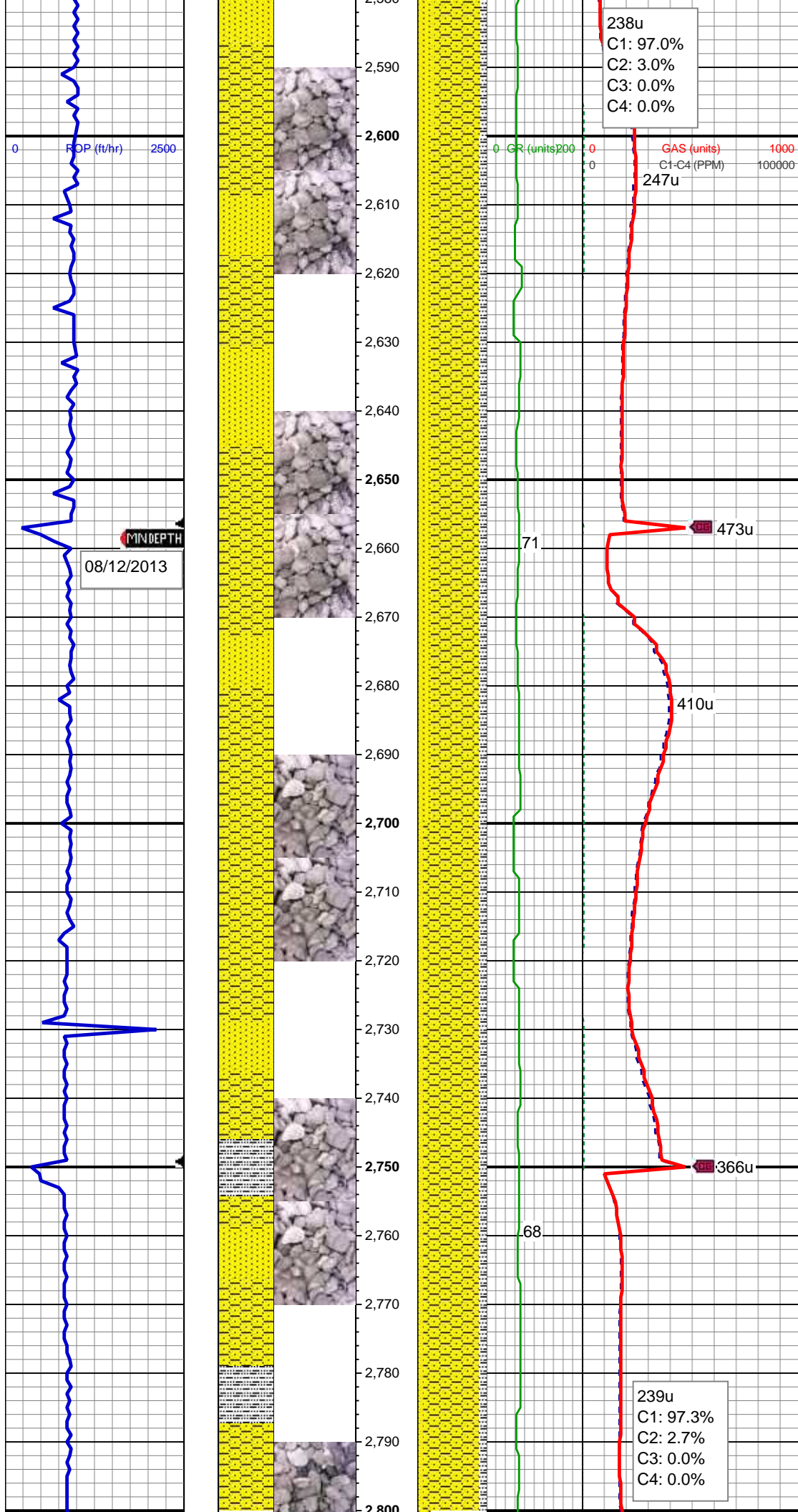
MD: 2,421 '  
TVD: 2,404.63 '  
Inclination: 14.6 °  
Azimuth: 166.3 °  
VS: 31.35 '

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SS: wh - trnsl, s&p, f gr, sb ang-sb rnd,  
p-mod srt, tr glau, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ plty, arg-rthy mtx, non calc

MD: 2,513 '  
TVD: 2,493.36 '  
Inclination: 16 °  
Azimuth: 164.4 °  
VS: 38 '

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SS: wh - trnsl, s&p, f gr, sb ang-sb rnd,  
p-mod srt, tr glau, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ plty, arg-rthy mtx, non calc





MD: 2,606 '  
TVD: 2,582.65 '  
Inclination: 16.5 °  
Azimuth: 164.2 °  
VS: 45.57 '

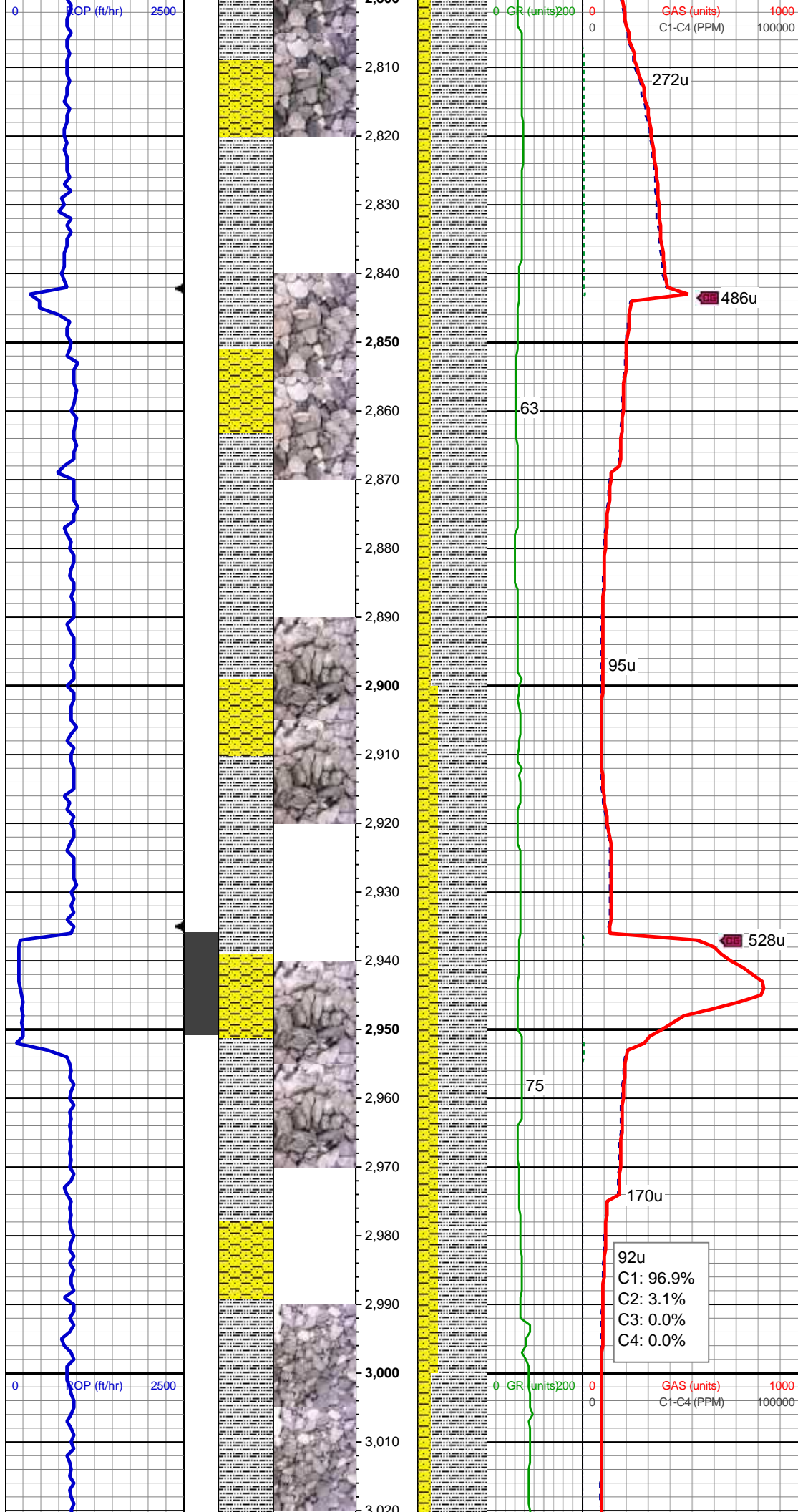
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SS: wh - trns, s&p, f gr, sb ang-sb rnd,  
p-mod srt, tr glau, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ pty, arg-rthy mtx, non calc

MD: 2,698 '  
TVD: 2,670.91 '  
Inclination: 16.3 °  
Azimuth: 162.8 °  
VS: 53.47 '

WT IN 8.75/ OUT 8.75  
VIS IN 27/ OUT 27

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SS: wh - trns, s&p, f gr, sb ang-sb rnd,  
p-mod srt, tr glau, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ pty, arg-rthy mtx, non calc

MD: 2,792 '  
TVD: 2,761.24 '  
Inclination: 15.8 °  
Azimuth: 161.9 °  
VS: 61.86 '



SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt

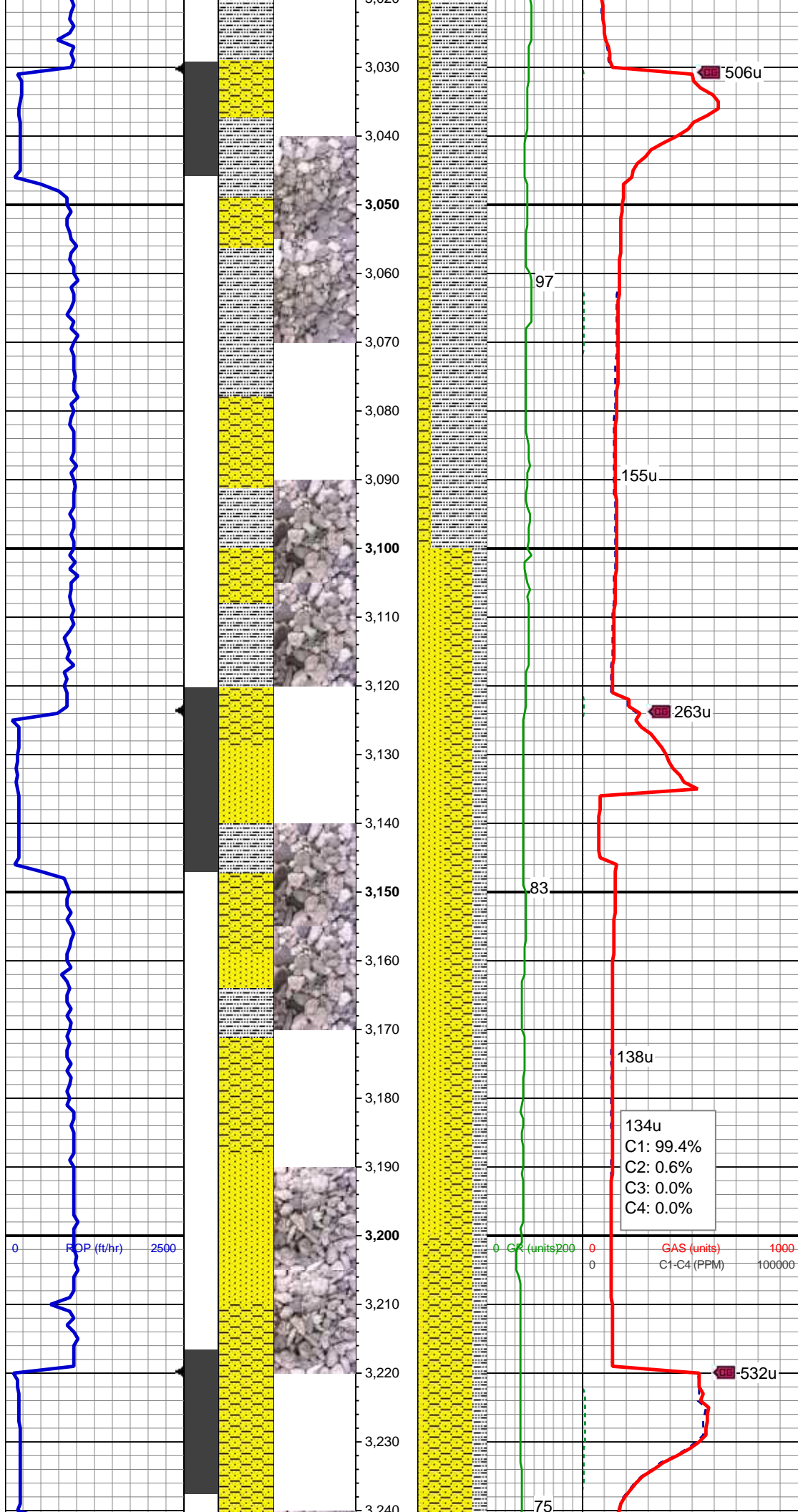
MD: 2,885 '  
TVD: 2,850.79 '  
Inclination: 15.5 °  
Azimuth: 160.2 °  
VS: 70.51 '

SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ plty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt

MD: 2,978 '  
TVD: 2,940.96 '  
Inclination: 12.8 °  
Azimuth: 158.6 °  
VS: 78.92 '

92u  
C1: 96.9%  
C2: 3.1%  
C3: 0.0%  
C4: 0.0%





SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ pty, arg-rthy mtx, non calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt

MD: 3,070 '  
TVD: 3,031.13 '  
Inclination: 10.1 °  
Azimuth: 158.2 °  
VS: 86 '

WT IN 8.80/ OUT 8.80  
VIS IN 28/ OUT 28

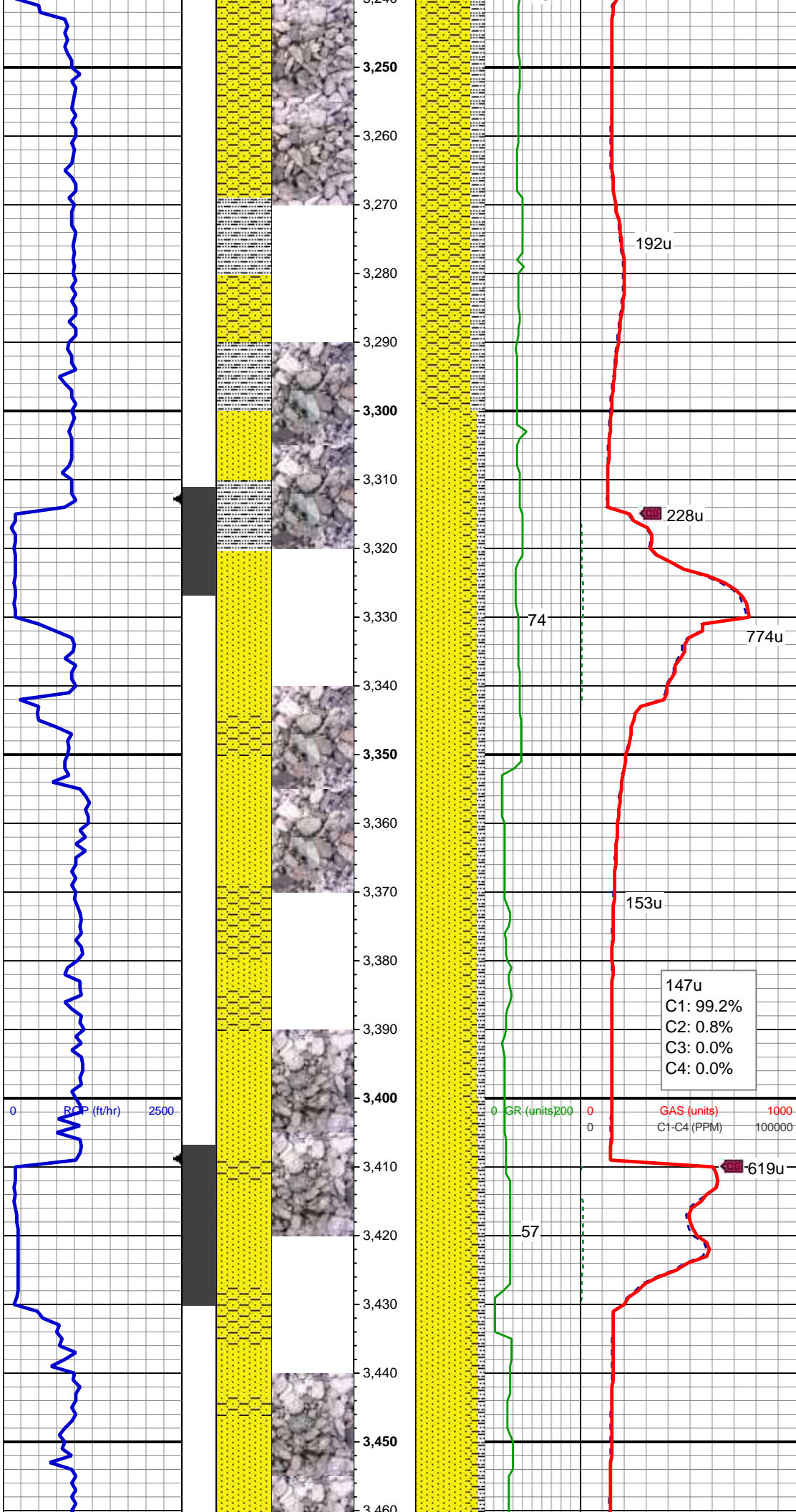
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SS: wh - trns, s&p, f gr, sb ang-sb rnd,  
p-mod srt, tr glau, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ pty, arg-rthy mtx, non calc

MD: 3,165 '  
TVD: 3,124.88 '  
Inclination: 8.5 °  
Azimuth: 164.6 °  
VS: 91.26 '

WT IN 8.90/ OUT 8.90  
VIS IN 28/ OUT 28

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb





SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ plty, arg-rthy mtx, non calc  
SS: wh - trnsl, s&p, f gr, sb ang-sb rnd,  
p-mod srt, tr glau, arg cmt

MD: 3,260 '  
TVD: 3,218.95 '  
Inclination: 7.5 °  
Azimuth: 172.3 °  
VS: 94.23 '

WT IN 8.90/ OUT 8.90  
VIS IN 28/ OUT 28

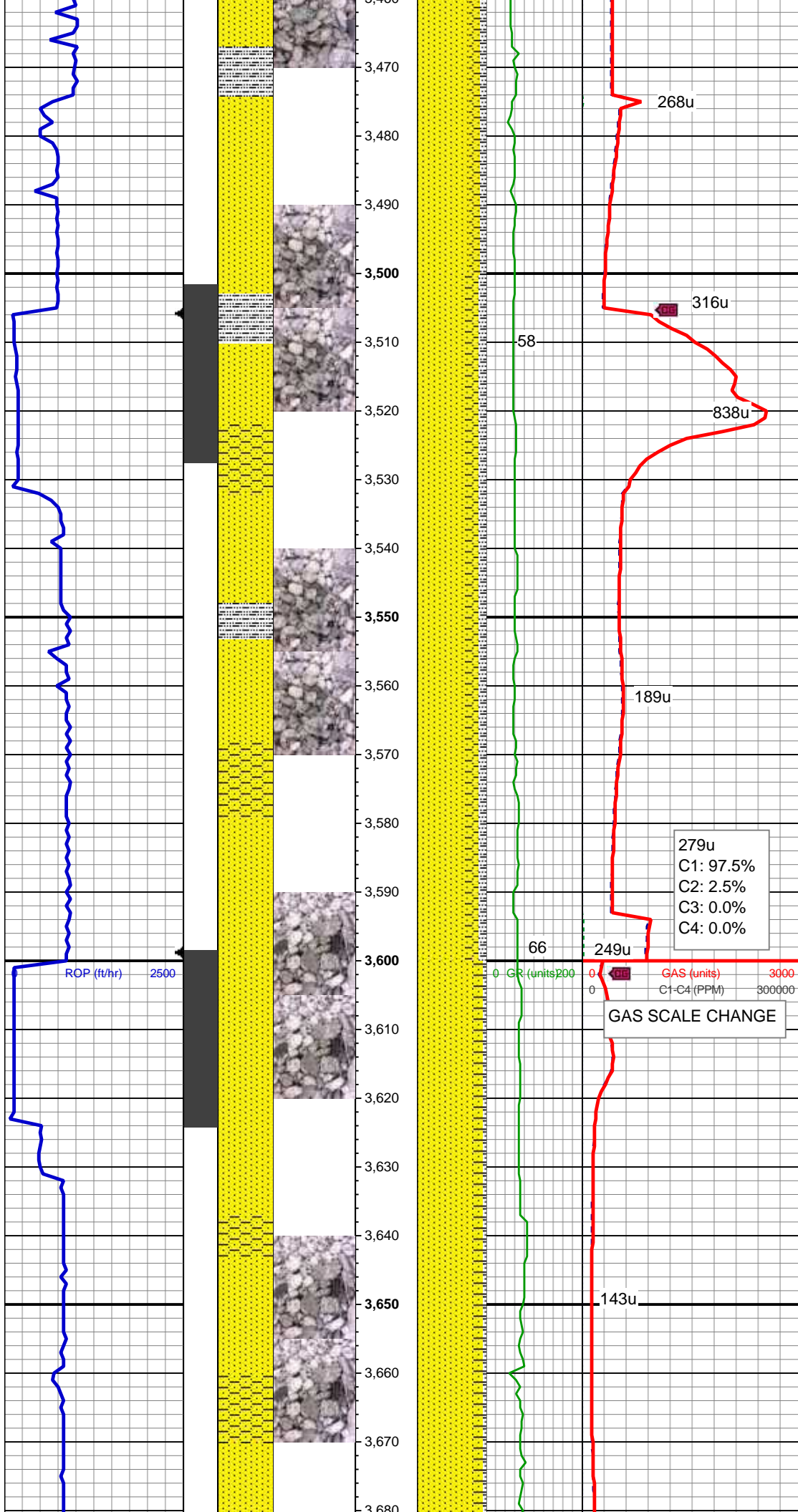
SS: wh - trnsl, s&p, f gr, sb ang-sb rnd,  
p-mod srt, occ glau, arg cmt  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ plty, arg-rthy mtx, non calc

MD: 3,355 '  
TVD: 3,313.27 '  
Inclination: 6.2 °  
Azimuth: 171.3 °  
VS: 96.07 '

147u  
C1: 99.2%  
C2: 0.8%  
C3: 0.0%  
C4: 0.0%

MD: 3,449 '  
TVD: 3,406.8 '  
Inclination: 5.3 °  
Azimuth: 166.9 °  
VS: 98.02 '

SS: wh - trnsl, occ tan, s&p, f gr, sb ang-sb  
rnd, p-mod srt, occ glau, arg cmt  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt



ang - sb md, p - mod srt, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ plty, arg-rthy mtx, non calc

WT IN 8.75/ OUT 8.75  
VIS IN 28/ OUT 28

MD: 3,544 '  
TVD: 3,501.48 '  
Inclination: 4.1 °  
Azimuth: 160 °  
VS: 100.33 '

SS: wh - trnsI,occ tan, s&p, f gr, sb ang-sb  
rnd, p-mod srt, occ glau, arg cmt  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SLTY SH: lt-med gy, sft - mod frm, sb  
blky, occ plty, arg-rthy mtx, non calc

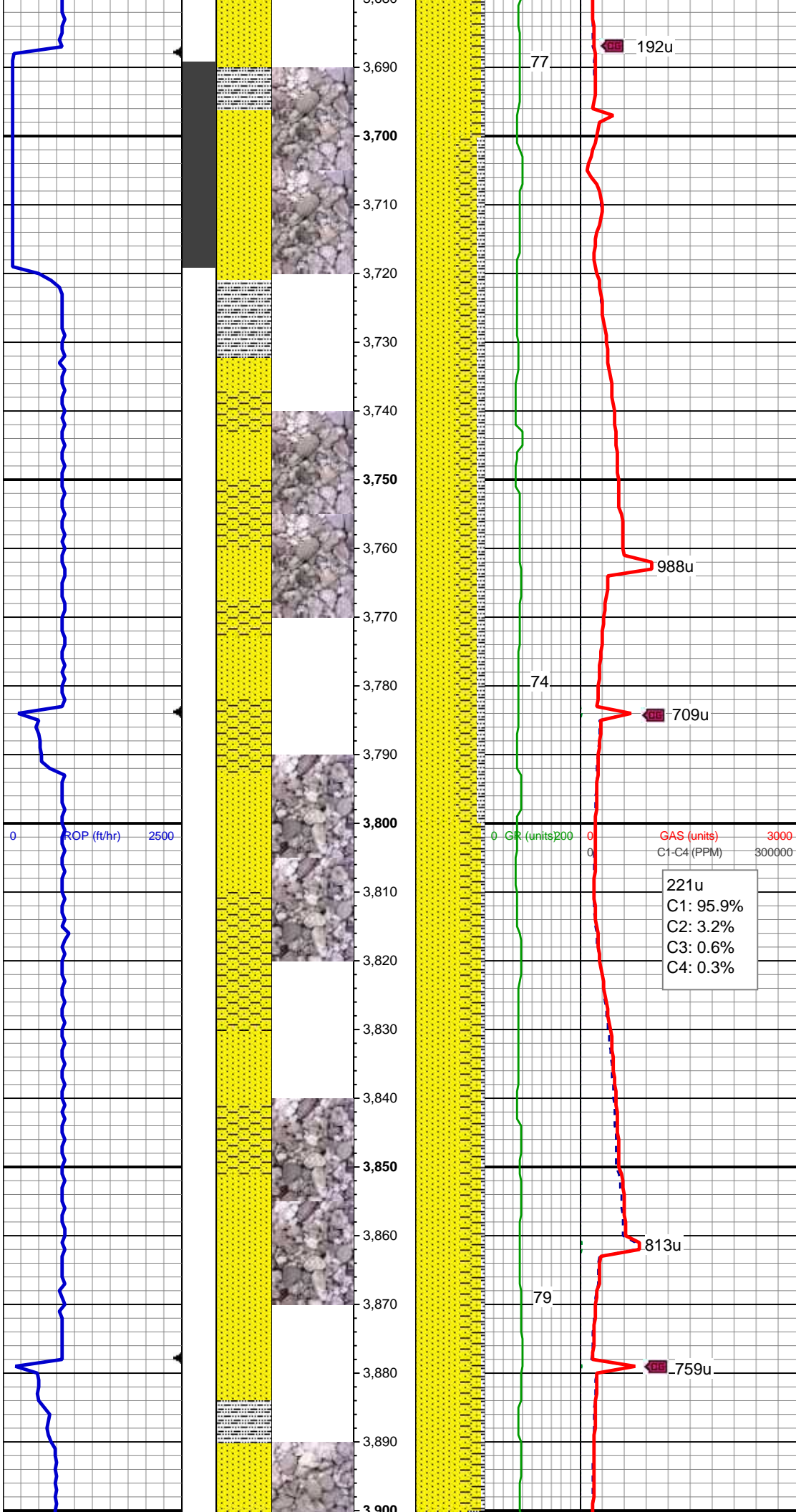
279u  
C1: 97.5%  
C2: 2.5%  
C3: 0.0%  
C4: 0.0%

GAS SCALE CHANGE

MD: 3,639 '  
TVD: 3,596.32 '  
Inclination: 2.5 °  
Azimuth: 152.6 °  
VS: 102.55 '

SS: wh - trnsI,occ tan-ltgy, s&p, f gr, sb  
ang-sb rnd, p-mod srt, occ glau, arg cmt  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SLTY SH: med gy,occ drkgy, sft - mod  
frm, sb blky, occ plty, arg-rthy mtx, non  
calc





MD: 3,734 '  
TVD: 3,691.29 '  
Inclination: 0.5 °  
Azimuth: 229.3 °  
VS: 103.23 '

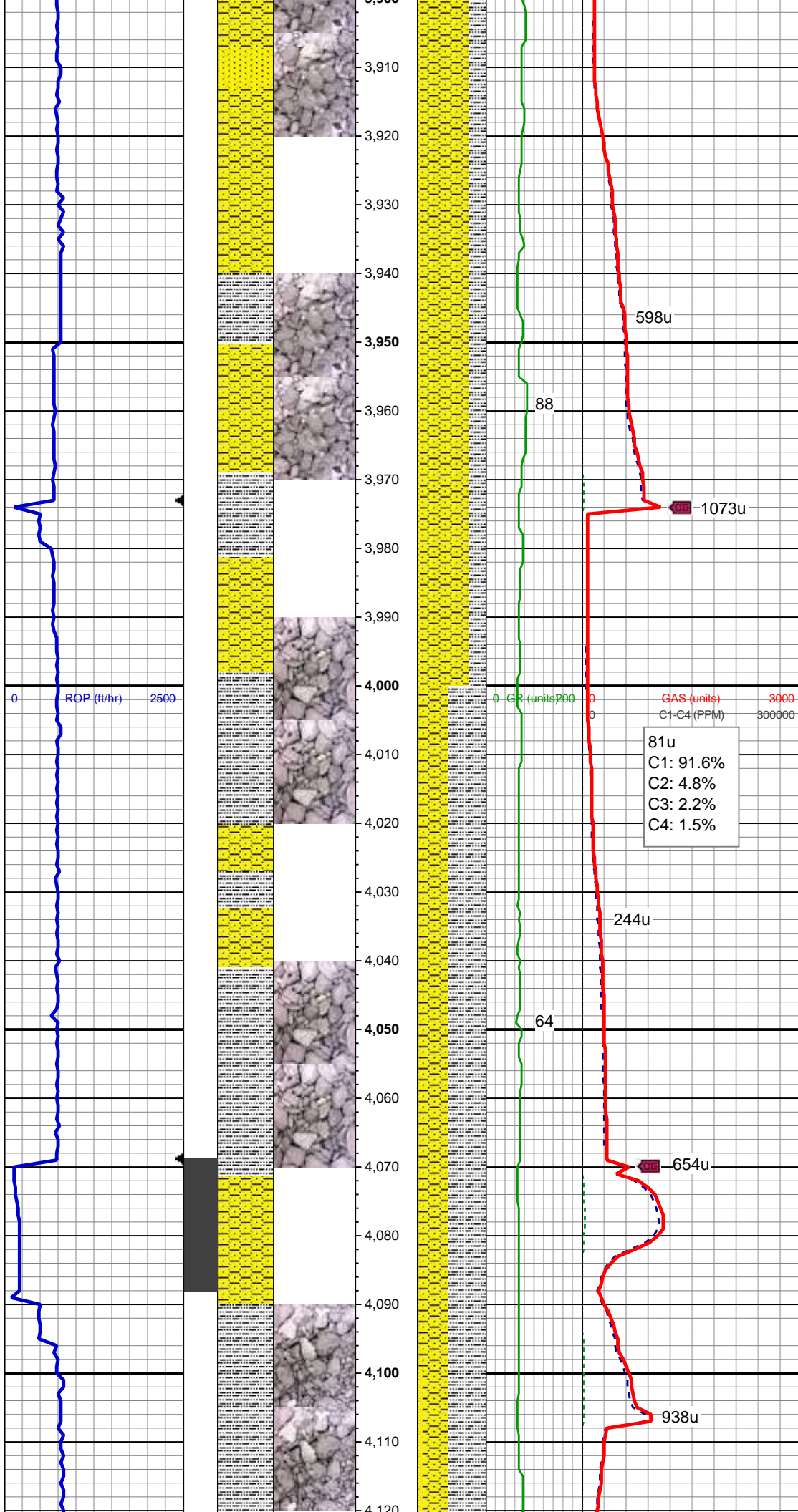
SS: wh - trnsI,occ tan-ltgy, s&p, f gr, sb  
ang-sb rnd, p-mod srt, occ glau, arg cmt  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SLTY SH: med gy,occ drkgy, sft - mod  
frm, sb blkly, occ plty, arg-rthy mtx, non  
calc

WT IN 8.80/ OUT 8.80  
VIS IN 28/ OUT 28

MD: 3,829 '  
TVD: 3,786.28 '  
Inclination: 0.8 °  
Azimuth: 196 °  
VS: 102.76 '

SS: wh - trnsI,occ tan-ltgy, s&p, f gr, sb  
ang-sb rnd, p-mod srt, tr glau, arg cmt  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt  
SLTY SH: med gy,occ drkgy, sft - mod  
frm, sb blkly, occ plty, arg-rthy mtx, non  
calc





MD: 3,923 '  
TVD: 3,880.27 '  
Inclination: 1.1 °  
Azimuth: 187.4 °  
VS: 102.49 '

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, arg cmt  
SLTY SH: med gy, occ drkgy, sft - mod frm, sb blkly, occ plty, arg-rthy mtx, non calc  
SS: wh - trnsl, occ tan-ltgy, s&p, f gr, sb ang-sb rnd, p-mod srt, tr glau, arg cmt

598u

88

1073u

0 ROP (ft/hr) 2500

0 GR (units) 200 0 GAS (units) 3000  
C1-C4 (PPM) 300000

81u  
C1: 91.6%  
C2: 4.8%  
C3: 2.2%  
C4: 1.5%

MD: 4,018 '  
TVD: 3,975.24 '  
Inclination: 1.4 °  
Azimuth: 201.1 °  
VS: 102 '

244u

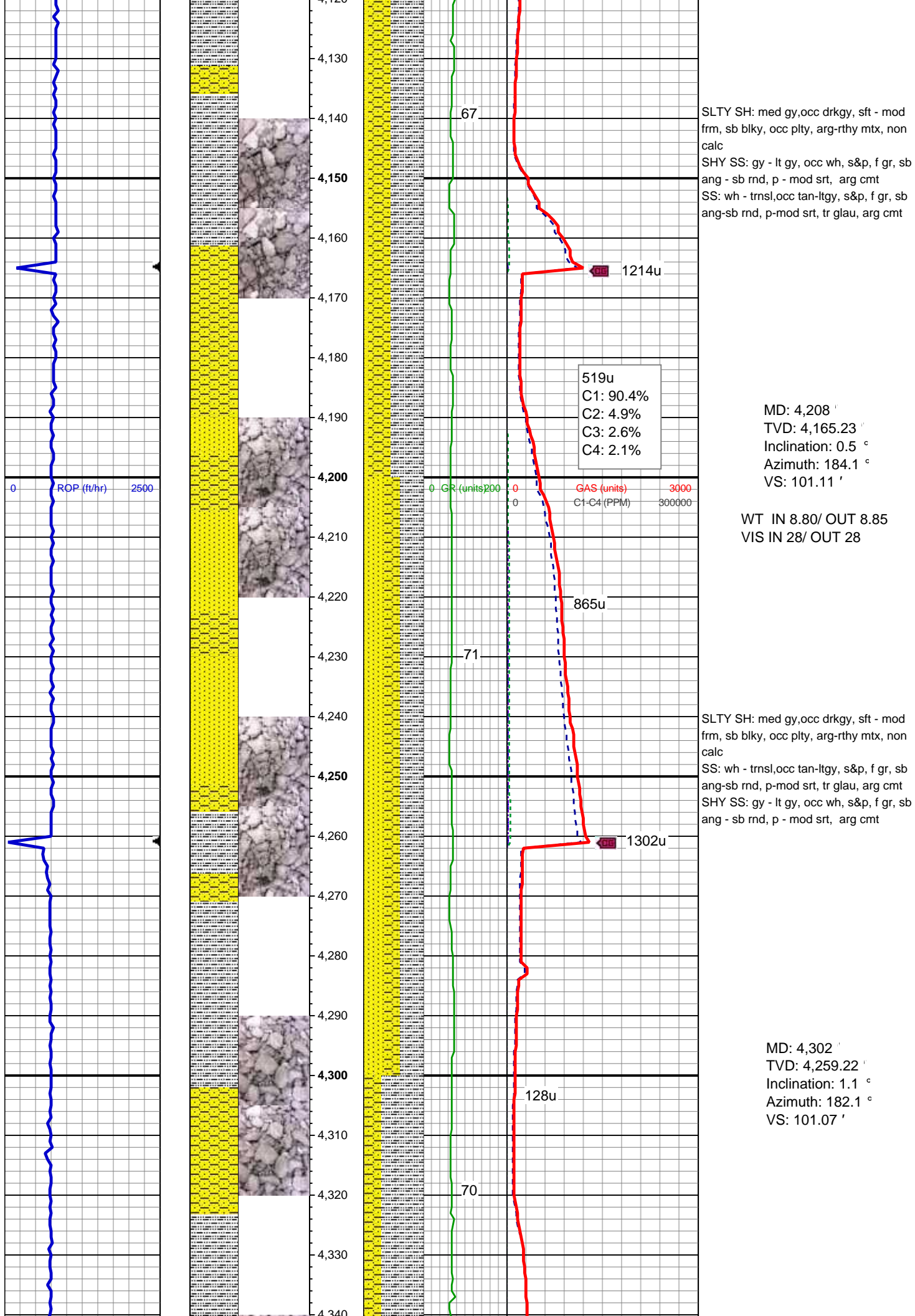
64

SLTY SH: med gy, occ drkgy, sft - mod frm, sb blkly, occ plty, arg-rthy mtx, non calc, tr ss  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb ang - sb rnd, p - mod srt, arg cmt

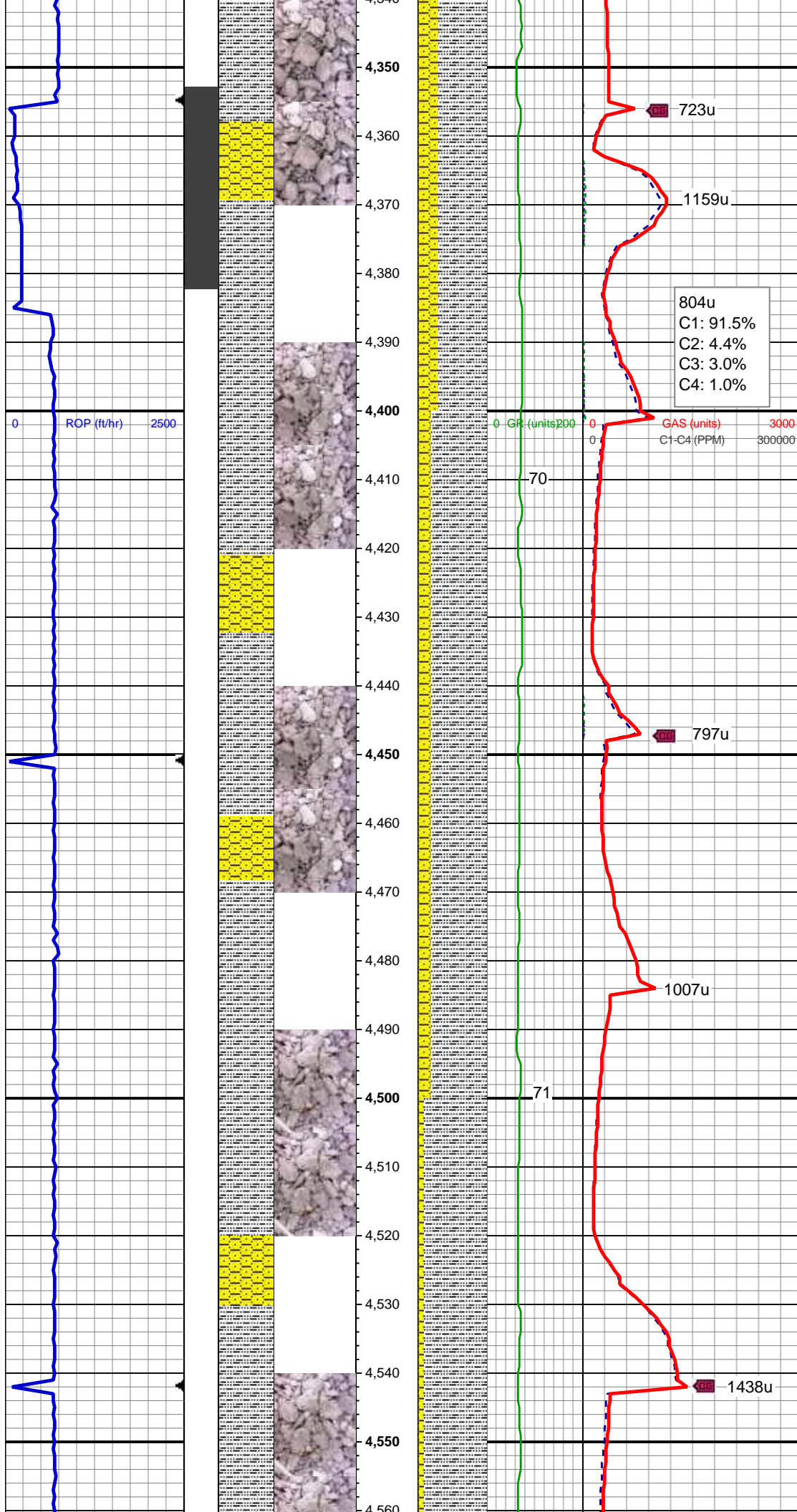
654u

938u

MD: 4,113 '  
TVD: 4,070.23 '  
Inclination: 0.3 °  
Azimuth: 254.9 °  
VS: 101.37 '







SLTY SH: med gy, occ drkgy, sft - mod  
frm, sb blk, occ plty, arg-rthy mtx, non  
calc

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt, tr ss

WT IN 8.80/ OUT 8.80  
VIS IN 28/ OUT 28

MD: 4,397 '  
TVD: 4,354.22 '  
Inclination: 0.3 °  
Azimuth: 319.6 °  
VS: 100.89 '

SLTY SH: med gy, occ drkgy, sft - mod  
frm, sb blk, occ plty, arg-rthy mtx, non  
calc

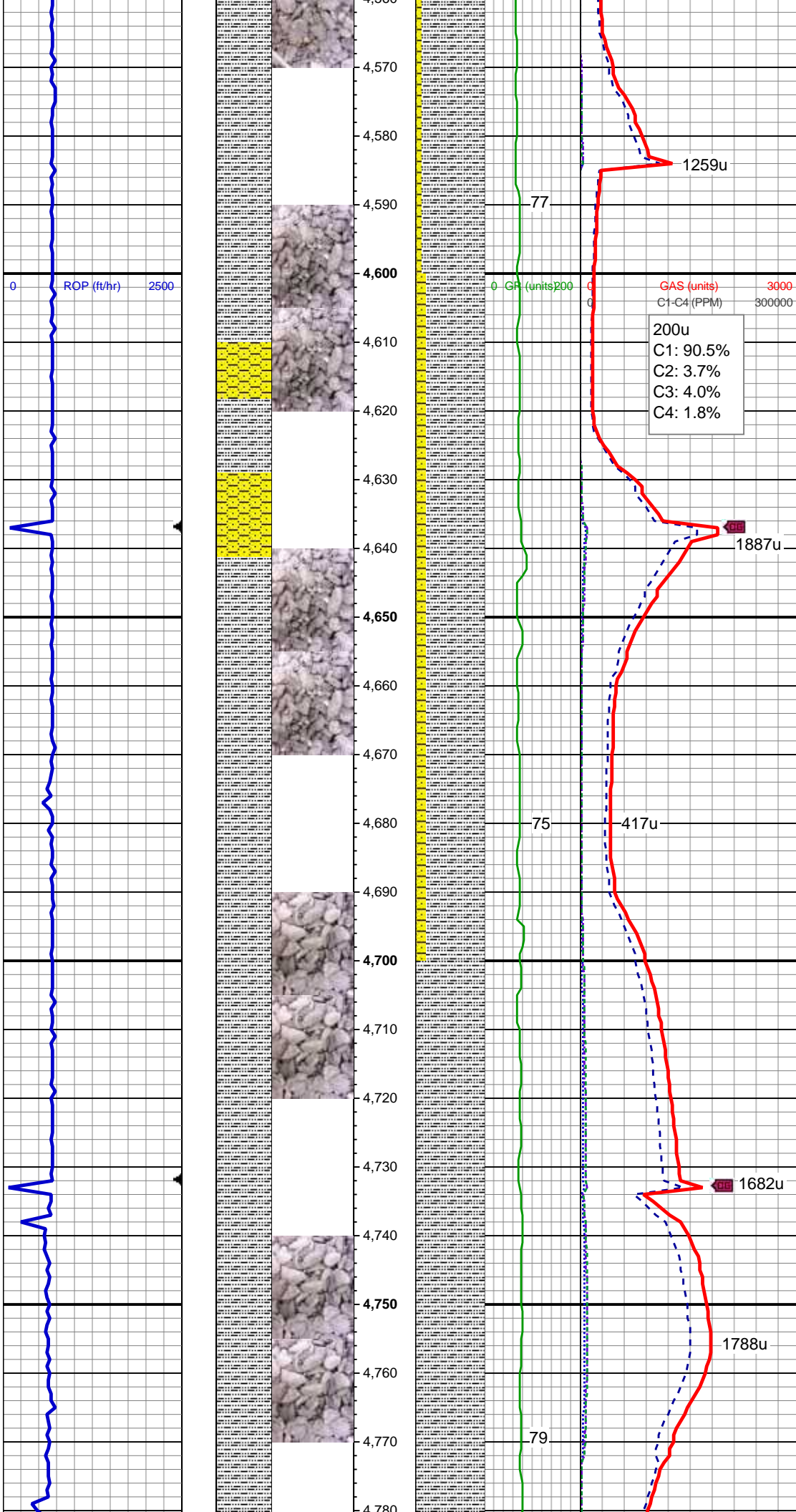
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt

MD: 4,492 '  
TVD: 4,449.22 '  
Inclination: 0.5 °  
Azimuth: 225.9 °  
VS: 100.44 '

SLTY SH: med gy, occ drkgy, sft - mod  
frm, sb blk, occ plty, arg-rthy mtx, non  
calc

SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt





MD: 4,586 '  
TVD: 4,543.21 '  
Inclination: 0.7 °  
Azimuth: 251.4 °  
VS: 99.61 '

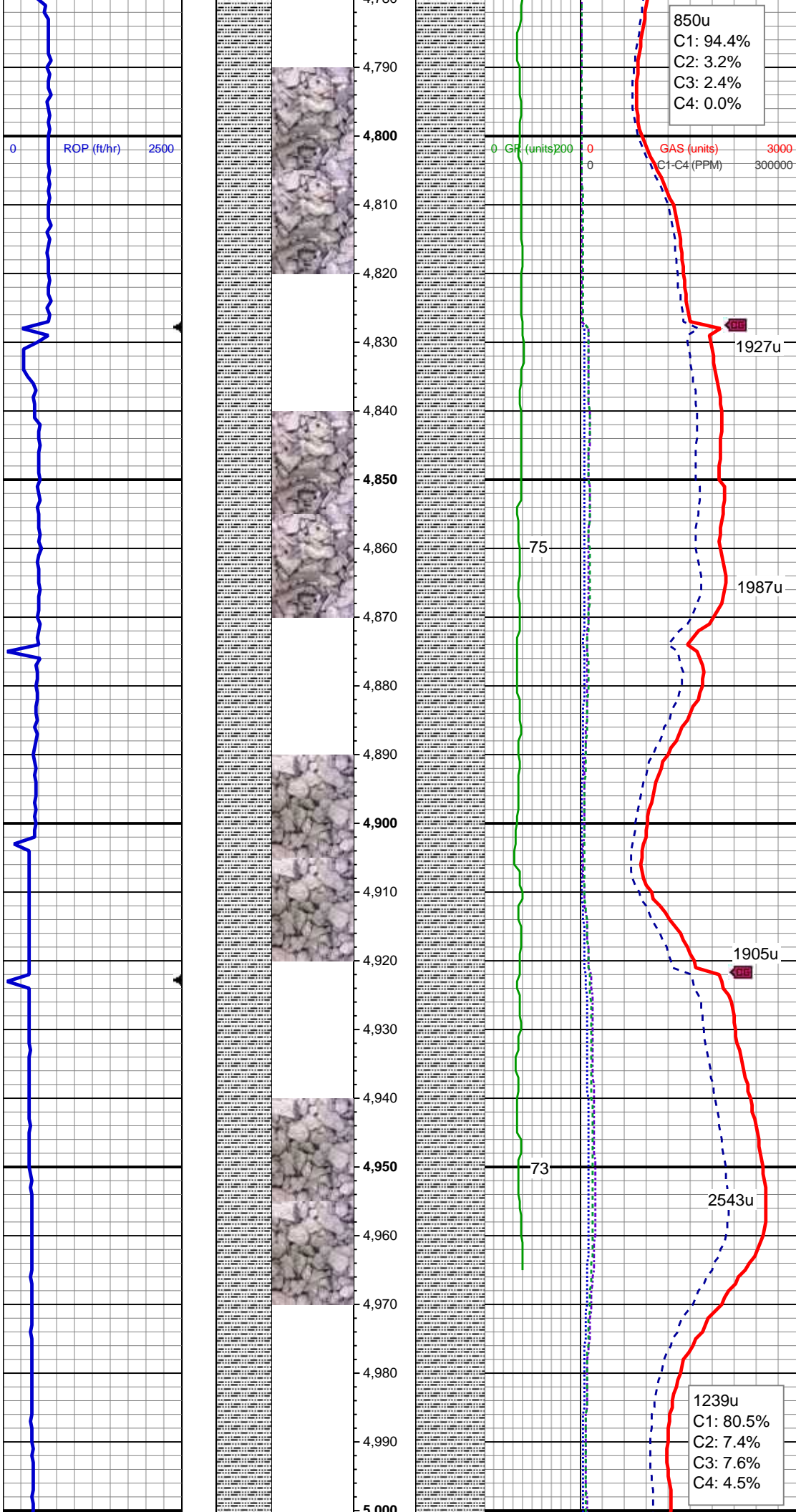
WT IN 8.75/ OUT 8.90  
VIS IN 28/ OUT 27

SLTY SH: med gy, occ drkgy, sft - mod  
frm, sb blk, occ pty, arg-rthy mtx, non  
calc  
SHY SS: gy - lt gy, occ wh, s&p, f gr, sb  
ang - sb rnd, p - mod srt, arg cmt

MD: 4,681 '  
TVD: 4,638.2 '  
Inclination: 0.9 °  
Azimuth: 231.7 °  
VS: 98.49 '

SLTY SH: med gy, occ drkgy, sft - mod  
frm, sb blk, occ pty, rthy mtx, tr arg mtx,  
non calc, tr shy ss

MD: 4,776 '  
TVD: 4,733.19 '  
Inclination: 0.7 °  
Azimuth: 199.2 °  
VS: 97.73 '



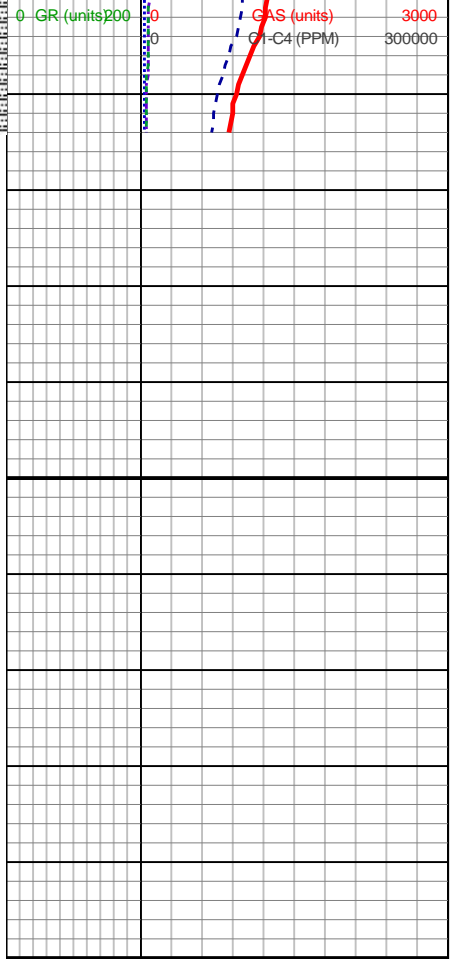
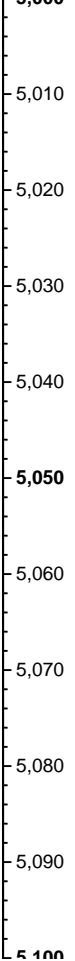
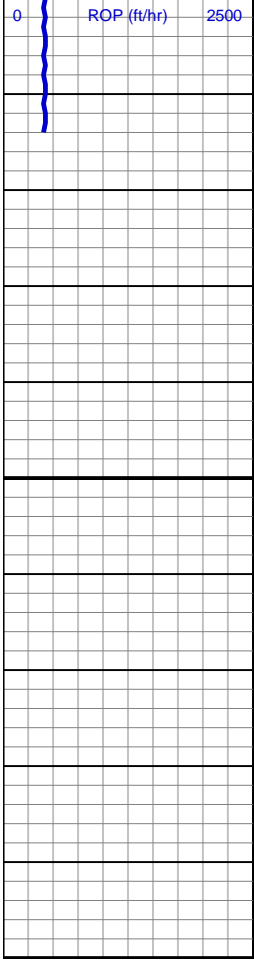
SLTY SH: med gy, occ drkgy, sft - mod  
frm, sb blk, occ plty, rthy mtx, tr arg mtx,  
non calc, tr shy ss

MD: 4,870 '  
TVD: 4,827.18 '  
Inclination: 0.9 °  
Azimuth: 148.4 °  
VS: 97.95 '

WT IN 8.75/ OUT 8.75  
VIS IN 34/ OUT 34

SLTY SH: med gy, occ drkgy, sft - mod  
frm, sb blk, occ plty, rthy mtx, tr arg mtx,  
non calc

MD: 4,965 '  
TVD: 4,922.18 '  
Inclination: 0.4 °  
Azimuth: 152.1 °  
VS: 98.52 '



TD @ 5014' MD  
08/12/2013 @ 09:19 AM

TOOH FOR MWD TOOLS  
LOG CONTINUES ON L PLOT  
"ROHN STATE LD04-68-1HN(HORZ)"

Thank you for choosing  
Columbine Logging Inc.